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Lewis Research Center



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Computing Incompressible Laminar and Turbulent Boundary Layer Formation

The problem:

To compute the development of a boundary layer on a surface, given the freestream velocity distribution.

The solution:

A computer program that numerically integrates the equations of motion for an incompressible two-dimensional boundary layer.

How it's done:

Boundary layer calculations may be carried out for both laminar and turbulent flow with arbitrary Reynolds number and mainstream velocity distribution, on planar or axisymmetric bodies, with wall suction or blowing, and with a rough or a smooth wall. Various options are available as initial conditions. The program can generate: (1) initial laminar conditions, such as in Falkner-Skan similarity flows (to simulate initial wedge flows, including Blasius or stagnation point flow); or (2) turbulent equilibrium profiles. Alternatively, initial profile input data can be utilized.

Notes:

1. The program can be combined with inviscid-freestream calculations to predict, for instance, an entire flow field in a turbine cascade or around an airfoil.
2. Requests for further information may be directed to:

COSMIC
Barrow Hall
University of Georgia
Athens, Georgia 30601
Reference: B71-10155

Patent status:

No patent action is contemplated by NASA.

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